

Large Scale Observations: a SEARCH workshop
November 27-29, 2001, Seattle, WA
<http://www.epic.noaa.gov/SEARCH/obs/workshop>

Large Scale Observations: a SEARCH workshop
November 27-29, 2001, Seattle, WA
<http://www.epic.noaa.gov/SEARCH/obs/workshop/>

Large Scale Surface Parameter Data Sets

Florence Fetterer
National Snow and Ice Data Center
Boulder, CO

SEARCH investigators will want to make use of data sets that cover a large spatial scale and a long period of time, and are part of an ongoing data collection or data processing program. Data should also be easy to access. Below are data sets that have at least some of these desirable qualities. There are significant gaps: for example I found few suitable snow cover data sets. I hope we will uncover data sets that can fill these gaps at the workshop.

Two-meter air temperature

IABP/POLES 2-Meter Air Temperature Data Set

Fields (100 km equal area EASE-Grid) cover the area north of 60 degrees North. Data are available for every 12 hours, for 1979 through present. IABP/POLES unites the two most extensive sources of Arctic Ocean air temperature data: the International Arctic Buoy Program (IABP) and Russian North Pole (NP) drifting stations (not in operation since 1991). The IABP data in IABP/POLES Temperature Data Set were quality-controlled, and a warm bias was removed using the NP data as a standard. Updated periodically. See <http://iabp.apl.washington.edu/AirT/index.html>.

NCAR ds570.0, World Monthly Surface Station Climatology, 1738-cont

Data from National Climatic Data Center (NCDC) *Monthly Climate Data of the World*, plus other data sources including World Weather Records from the Smithsonian Institution, the U.S. Weather Bureau, and the Department of Commerce. Standard parameters are sea level pressure, station pressure, temperature, and precipitation. After 1960, moisture parameters are available. Data from more than 4700 stations were quality controlled at NCAR by looking for deviations of greater than four or five standard deviations from the long period monthly mean. These extreme values were then manually inspected and either accepted, or set to missing. Updated yearly. Currently through Dec 1998. See <http://dss.ucar.edu/datasets/ds570.0/>.

The Global Historical Climatology Network

The GHCN contains monthly average temperature and precipitation data. Version 2 contains temperature data from over 7000 stations. Temperature data have been quality controlled by a variety of methods, as documented in "Quality Control of Monthly Temperature Data: the GHCN Experience", by T.C. Peterson, R. Vose, R. Schmoyer, and

V. Razuvaev (<http://www.ncdc.noaa.gov/ol/climate/research/ghcn/ghcnqc.html>). Extensive metadata are available. In addition to the quality-controlled monthly data, a quality controlled and homogeneity adjusted version is available. This version makes historical data homogeneous with present day observations by adjusting for non-climatic discontinuities. The GHCN incorporates data from NCAR ds570.0, and from many additional sources. A subset of all GHCN stations is updated monthly (primarily those for which data from the Global Telecommunications System or GTS, are available). See <http://lwf.ncdc.noaa.gov/oa/climate/research/ghcn/ghcnoverview.html> and <ftp://www.ncdc.noaa.gov/pub/data/ghcn/v2/>

For any given station, the GHCN may have more than one time series and each time series taken singly may not cover the entire history of that station. NCAR ds570.0, *World Monthly Surface Station Data Climatology*, has only one time series for each station that generally covers the entire history of the station. In deciding whether to use GHCN or ds570.0 records for temperature, users must weigh the inconvenience of having to piece together time series for a single station against the superior QC of the GHCN data set.

Arctic Climatology Project Arctic Meteorology and Climate Atlas, Russian coastal stations

Monthly mean two-meter air temperature, sea level pressure, total and low cloud amount, and relative humidity from 65 coastal stations for the period of record (Earliest is 1897, most start around 1940) through 1990. Note that data from these stations did not consistently make it onto the GTS and into other data sets, such as the two above. The International Arctic Research Center at UAF has funded V. Radionov at the Russian Arctic and Antarctic Research Center to update these records through 1999. The NOAA ESDIM program will fund V. Radionov to provide data from an additional 50 stations between 60 degrees and 75 degrees North. See <http://nsidc.org/data/g01938.html>.

Precipitation

Former Soviet Union Monthly Precipitation Archive, 1891-1993

Monthly precipitation totals from 622 stations. Work on this archive began at the State Hydrological Institute in St. Petersburg in 1977. The data are available on-line at NSIDC along with a file containing the correction factors so that it is possible to reconstruct the uncorrected data. See <http://nsidc.org/data/nsidc-0059.html>. Data through 1993 are available now. NSIDC will provide updates through 1999 in the coming year. Further periodic updates are a possibility.

Canadian Monthly Precipitation

(NOAA National Climatic Data Center (NCDC) data set TD-9816.)

Adjusted Monthly Precipitation, Snowfall and Rainfall for Canada (1874-1990).

Large Scale Observations: a SEARCH workshop
November 27-29, 2001, Seattle, WA
<http://www.epic.noaa.gov/SEARCH/obs/workshop>

These data sets were prepared by P. Groisman. The original data were purchased by NCDC from the Canadian Atmospheric Environment Service in the early 1990s and then subjected to bias corrections. A total of 6692 stations are available, extending from the beginning of record to 1990. *Adjusted Monthly Precipitation, Snowfall and Rainfall for Canada* contains only the corrected data, while *Canadian Monthly Precipitation* (TD-9816) has original data as well. See <http://nsidc.org/data/nsidc-0072.html>.

Historical Canadian Climate Database Version 2: Monthly Rehabilitated Precipitation and Homogenized Temperature Data Sets

This data set has data from a subset of stations in the above Canadian data sets. Data were processed in a different way. The data are provided by the Climate Monitoring and Data Interpretation Division of the Climate Research Branch, Meteorological Service of Canada, extend through 1999, and will be updated. See <http://www.cccma.bc.ec.gc.ca/hccd/>.

The Global Historical Climatology Network

See GHCN under two-meter air temperature, above. One subset of GHCN precipitation data is *NOAA/CMDL World Climate Data, Global Historical Climatology Network for Alaska* (See <http://nsidc.org/data/arcss014.html>)

NCAR ds570.0, World Monthly Surface Station Climatology, 1738-cont

See ds570.0, under two-meter air temperature, above.

Federal Climate Complex Global Surface Summary Of Day Data Version 6

NCDC's Climate Services Branch produces global summary of day data for 18 surface meteorological elements including precipitation. These are derived from the synoptic/hourly observations contained in TD9956 (USAF DATSAV3 Surface data). Historical data are generally available for 1973 to the present, with some stations having data back to before 1930. Data from 1994 on are available on-line. Synoptic data undergo extensive automated QC. These data are QC'ed further as the summary of day data are derived. Data are ongoing, and are normally available a few days after the end of the data week. A visualization tool (CLIMVIS) can be used to plot data from individual stations. See <ftp://ftp.ncdc.noaa.gov/pub/data/globalsod/readme.txt>.

The ArcticRIMS project: A Regional, Integrated Hydrological Monitoring System for the Pan-Arctic Land Mass

This project will include the production of precipitation on a 25 km grid, updated monthly. Fields will be based on a combination of reanalysis data and observations. The RIMS website (<http://www.watsys.sr.unh.edu/arctic/RIMS/>) is limited to ArcticRIMS members only at this time.

Arctic Climatology Project Arctic Meteorology and Climate Atlas, Gridded monthly mean precipitation, climatological means for period 1950-1990

Large Scale Observations: a SEARCH workshop
November 27-29, 2001, Seattle, WA
<http://www.epic.noaa.gov/SEARCH/obs/workshop>

Fields (250 km equal area EASE-Grid) were created from station data using iterated Cressman interpolation and a first guess (Legates and Willmott climatology) field. Precipitation over land uses the *Former Soviet Union Monthly Precipitation Archive, 1891-1993* and *Canadian Monthly Precipitation* (see above). Monthly precipitation totals for the Arctic Ocean are Russian North Pole (NP) drifting station data corrected for biases by Daqing Yang. There are no plans to remake these 12 average precipitation fields with additional data, but they are mentioned here because they were prepared with bias-corrected data and are a convenient representation of climatology. See <http://nsidc.org/data/g01938.html>.

Snow Extent, Depth, and Water Equivalent

Northern Hemisphere EASE-Grid Weekly Snow Cover and Sea Ice Extent

This product combines snow cover and sea ice extent at weekly intervals for October 1978 through August 1995, and snow cover alone for January 1971 through October 1978. (Sea ice data were not available prior to October 23, 1978.) Also includes monthly climatologies describing average extent, probability of occurrence, and variance. Data are provided in a 25 km equal area grid (EASE-Grid). Snow cover extent is based on the digital NOAA-NESDIS Weekly Northern Hemisphere Snow Charts, revised by D. Robinson. The original NOAA-NESDIS weekly snow charts are derived from the manual interpretation of AVHRR, GOES and other visible-band satellite data. Sea ice extent is based on the NSIDC polar stereographic sea ice concentration grids, derived from Scanning Multi-channel Microwave Radiometer (SMMR) and Special Sensor Microwave Imager (SSM/I) passive microwave brightness temperature data. The snow cover product will be extended back to 1966, and the combined product brought up to 1999, in the coming year. See <http://nsidc.org/data/nsidc-0046.html>.

Former Soviet Union Hydrological Snow Surveys

Data from 1345 sites throughout the Former Soviet Union include ten day mean snow depths at a WMO station and snow depth and snow water equivalent measured over a nearby snow course transect on a single day. From the Institute of Geography, Russian Academy of Science, Moscow. Currently 1966 through the end of 1990 is available. A subset of stations will be updated through 1996, in the first half of 2002. See <http://nsidc.org/data/g01170.html>.

Snowfall and Snow Depth for Canada, 1943-1982

Data includes monthly snowfall and end-of-month snow depth for 140 stations across Canada. Stations which maintained at least 20 years of data were chosen. The data are originally from the Atmospheric Environment Service, Canada, and from the NOAA National Climatic Data Center. There are no plans to update this data set. See <http://nsidc.org/data/g00922.html>.

Weekly Ice Thickness and On-Ice Snow Depth Measurements for Canadian Stations

Large Scale Observations: a SEARCH workshop
November 27-29, 2001, Seattle, WA
<http://www.epic.noaa.gov/SEARCH/obs/workshop>

Ice thickness and snow depth measurements for 195 sites on fast ice. Record length varies, some stations exceed 50 years of observations. A number of sites are colocated with Environment Canada's hourly weather and radiation observing programs. Observations through 1998 are available. See <http://www.cis.ec.gc.ca/cia/icesnow.html>.

Alaska snow data

The United States Department of Agriculture (USDA) National Resource Conservation Service (NRCS) has snow depth data. The NRCS Alaska home page (<http://www.ak.nrcs.usda.gov/>) has information on the Alaska snow survey program. Measurements are generally taken at the end of the month from January through April, although measurements may be taken mid-month at some locations. Information on the USDA NRCS SNOTEL network for snow depth and water content data is at <http://www.wcc.nrcs.usda.gov/factpub/sntlfct1.html>. SNOTEL data back to 1966 can be obtained from <http://www.wcc.nrcs.usda.gov/water/snow/sntlhist.pl>. For more information on these ongoing NRCS data collection programs in Alaska, contact Rick J. McClure, NRCS Anchorage Data Collection Office (rmclure@ak.usda.gov).

End-of-month snow depth data for 463 NOAA National Weather Service stations in Alaska is archived at the Alaska Climate Research Center of the Geophysical Institute, University of Alaska, Fairbanks

Arctic Climatology Project Arctic Meteorology and Climate Atlas, Gridded monthly mean snow depth

Fields (250 km equal area EASE-Grid) were created from station data using Cressman interpolation. Monthly means for snow over land was drawn from a total of 782 stations: the 197 stations north of 50° North in *Former Soviet Union Hydrological Snow Surveys*; the 35 stations north of 50° North from *Snowfall and Snow Depth for Canada, 1943-1982*, from 37 Alaska snow course locations from NRCS, from 463 Alaska stations from NWS, and from 50 Russian coastal stations. The years of overlap for these data sources are 1966 through 1982, therefore the 12 monthly mean fields are created from data from this period. There are no plans to remake these fields with additional data, but they are mentioned here because they are a convenient representation of climatology.

Surface Pressure

Surface pressure is available in *NCAR ds570.0, World Monthly Surface Station Climatology, 1738-cont;* *Federal Climate Complex Global Surface Summary Of Day Data Version 6;* and *Arctic Climatology Project Arctic Meteorology and Climate Atlas, Russian coastal stations.*

These data sets are described above.

Large Scale Observations: a SEARCH workshop
November 27-29, 2001, Seattle, WA
<http://www.epic.noaa.gov/SEARCH/obs/workshop>

Also see:

Comprehensive Ocean-Atmosphere Data Set (COADS)

Global surface marine data from 1854 through 1997, including 1° x 1° monthly summaries. Updated periodically. Quality-controlled observations from ships, moored environmental buoys, and drifting buoys include air temperature, sea surface temperature, barometric pressure, wind, humidity, cloudiness, weather, wave, and swell. COADS is a project of NOAA's Climate Diagnostics Center, the NOAA National Climatic Data Center (NCDC), the University of Colorado Cooperative Institute for Research in Environmental Science (CIRES), and the National Science Foundation's National Center for Atmospheric Research (NCAR). See <http://www.cdc.noaa.gov/coads/>.

The NCEP/NCAR Global Reanalysis Project produces pressure fields that are constrained by a model to be realistic and consistent with all assimilated data, and makes use of a large number of current and historical data sets. (Many parameters in addition to pressure are available). Reanalysis data from 1948 to present are on-line. See <http://www.cdc.noaa.gov/cdc/reanalysis/> and ftp://ncardata.ucar.edu/pub/reanalysis/proj_oview.html

Sea Ice

Northern Hemisphere EASE-Grid Weekly Snow Cover and Sea Ice Extent

See the description above.

DMSP SSM/I Daily and Monthly Polar Gridded Sea Ice Concentrations

Gridded 25 km daily average total and multiyear concentrations from the NASA Team algorithm and total concentrations from the Bootstrap algorithm. 1987-present, updated quarterly. See <http://nsidc.org/data/nsidc-0002.html>.

Bootstrap Sea Ice Concentrations from Nimbus-7 SMMR and DMSP SSM/I

Gridded 25 km daily average total concentrations from the modified Bootstrap algorithm. 1978 -present, updated quarterly. See <http://nsidc.org/data/nsidc-0079.html>.

Environmental Working Group Joint U.S.-Russian Arctic Sea Ice Atlas

Sea ice charts from Russian and U.S. sources from 1950 to 1994. Coverage for all of the Arctic Ocean and adjacent regions poleward from 45 degrees north latitude. The Russian charts (from the Arctic and Antarctic Research Institute) are based on a ten-day period of observation; the U.S. charts (from the National Ice Center) are based upon a seven-day period. The original charts are available in the atlas as both color maps and digital binary files. Monthly ice chart statistics are provided for each five-year period and the entire period of record. The atlas also contains a monthly sea ice climatology of median ice concentration and the number of years of occurrence. The latter climatology was derived from a combined set of unclassified seven-day sea ice charts and classified sea ice data from 1972 through 1990. Both nations digitized historical sea ice charts from paper

Large Scale Observations: a SEARCH workshop
November 27-29, 2001, Seattle, WA
<http://www.epic.noaa.gov/SEARCH/obs/workshop>

records as part of the atlas effort. The atlas contains ice chart data in World Meteorological Organization SIGRID format with detailed ice code descriptors for individual ice types and stages of ice development. Ice chart data are also available in the NSIDC EASE-Grid format with selected composite ice types and ice concentrations on a standardized grid and graphical chart. See <http://nsidc.org/data/g01962.html>.

Dates covered

Ongoing ?

Spatial coverage

Gridded or not?

Any special notes on formatting or access?

Any notes on QC or instrumentation?